

## Chapter 7

# Outlook

In the field of ethanol reforming, both the non-thermal plasma reforming process and the conventional catalyst reforming process are the widespread focus of investigation. In some literature, it has been pointed out that non-thermal plasma combined with a catalyst can efficiently improve the reforming efficiency. However, the non-thermal plasma-catalyst coupled system is very complex in the reforming reaction, and there is little literature that focuses on the overall introduction of the synergistic effect in the coupled reformation. Furthermore, the plasma reaction, the catalyst surface reaction and the synergistic effect are involved in the reforming process and plasma can modify the catalyst surface; all these factors bring a great challenge to theoretical numerical simulation. Based on the development of the theory of plasma fuel reforming and material reformation, the practice of the catalyst reforming process and the gradually maturing theoretical level, however, investigation on the mechanism and the numerical simulation of non-thermal arc plasma should be developed further. In the application on vehicles and mobile power, the non-thermal plasma reaction is always characterized by a low reaction temperature, high reactivation, a short response time, a small setup size and high energy efficiency. The conventional catalyst process also has the advantages of high conversion efficiency and high reactivity orientation. Hence, the non-thermal catalyst is a promising process to be widely used in vehicle applications. Furthermore, the miniaturization, integration, and low energy efficiency of non-thermal arc technology make it possible to apply it in the field of portable power; at that time, it will be possible to apply the non-thermal plasma process to a very large area ranging from power plants, public traffic to mobile phones.

Furthermore, since non-thermal plasma is very promising in fuel reforming, in the preparation of nanomaterials, in the surface modification of materials, in medical sterilization and in the treatment of environmental protection, it can be predicted that normalized and universal non-thermal plasma technology can be realized, paving the way for a low-cost, diversified/multifunctional non-thermal plasma process.